RESEARCH in Progress

Forest Products Laboratory

Assessments of Plantation Longleaf Pine Wood Quality: Comparisons to Natural Stands and Plantation Loblolly Pine

A planted 13-year-old longleaf pine stand.

Longleaf pine woodlands once dominated the Southern Coastal Plain, spanning about 90 million acres and covering much of the southern United States. This ecosystem was largely lost across the South, with vast longleaf pine forests converted to other pine species or agriculture fields that were later abandoned. Many of these cutover sites and fields were restored to forests through the establishment of loblolly and slash pine plantations, rather than reestablishing longleaf pine. More recent efforts have focused on reestablishing longleaf pine, with one touted advantage being the superior quality of its wood, especially its higher specific gravity (SG). Longleaf pine has higher wood quality than loblolly pine in natural stands. However, we do not know whether the same is true for planted stands. Loblolly pine has undergone extensive genetic selection for improved tree form traits, whereas longleaf pine has not.

Background

The major southern pine species are ecologically and economically important and consist of longleaf, loblolly, slash, and shortleaf. Longleaf pine is typically perceived as being of equal quality to slash pine, and higher in quality than loblolly pine or shortleaf pine (Kretschmann 2010). Some differences in SG between the species can be attributed to growing region. Longleaf pine typically grows near the southern coasts, a region that produces trees with "better" wood properties than those grown further north or further inland (Jordan et al. 2008). Eberhardt et al. (2017) showed that when grown in the same location, slash pine had greater SG than loblolly pine (0.523 and 0.498, respectively), but the differences were not nearly as large as those values reported in the *Wood Handbook* (Kretschmann 2010). Another reason for longleaf pine's perceived quality advantage over other southern pines could also be attributed to it being obtained from natural stands rather than plantations. Because of the high growth rate in plantations, trees are harvested at younger ages, and thus the wood has a higher proportion of corewood (juvenile wood) (Jordan et al. 2008, Dahlen et al. 2018).

Objective

The overall objective of this proposed study is to assess the wood and fiber quality for planted longleaf pine (both forest cutover and old agriculture field sites) compared with planted loblolly pine and naturally regenerated longleaf pine of the same product class (sawtimber).

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A planted longleaf pine cross-sectional disk.

Approach

We will sample "mature" stands that have large enough trees to produce structural lumber. To reduce the effect of regional variation on results, we will sample stands in southwest Georgia, with sampling centered around The Jones Center at Ichauway (Newton, Georgia). We will sample multiple stands from each stand type, felling the trees and collecting disks from each. We will prepare radial strips from the disks to assess within-tree variability in wood and fiber properties (SG, ultrasonic velocity, tracheid length, extractives, lignin). We will analyze the data and develop models that predict radial variability and variability with height between stand types. We will use the ring-by-ring data by property to generate whole-tree property maps and generate summaries of whole-tree and log-by-log wood properties. Statistical analysis will follow the results of Dahlen et al. (2018).

Expected Outcomes

This study will inform landowners and forest managers of the current quality of planted longleaf pine from both forest cutover and old agriculture field sites and how they compare with naturally regenerated longleaf pine and planted loblolly pine.

Timeline

The project will begin July 2020. In 2020 and 2021, we will select suitable stands for the study, measure plots to determine stand characteristics, and select trees for harvest. Field sampling will occur in the summer of 2021. In fall 2021, we will measure the wood and fiber properties and begin modeling the properties and determining stand differences. The project will conclude around June 2022.

Cooperators

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